

1994

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Recommended Citation

Sanders, Terry A. (1994) "Pleistocene and Halocene Remains from the Red River, Southwest Arkansas," *Journal of the Arkansas Academy of Science*: Vol. 48 , Article 34.
Available at: <http://scholarworks.uark.edu/jaas/vol48/iss1/34>

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Pleistocene and Holocene Remains From The Red River, Southwest Arkansas

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Abstract

Vertebrate remains have been found on gravel bars of the Red River in southwest Arkansas, northeast Louisiana, and east Texas. The majority of these specimens were recovered by amateur archaeologists and Dr. Frank Schambach of the Arkansas Archaeology Survey. Extinct species of bison (*Bison* sp.), mastodon (*Mammut americanum*), pampathere (*Holmesina septentrionalis*), llama (*Palaeolama mirifica*), tortoises (*Geochelone* sp.), and (*Terrapene* sp.) indicate a Pleistocene component in the region's alluvium. The giant tortoise, pampathere, and llama represent first known occurrences of these species for the state of Arkansas. Search times between finds were recorded for seven localities. The richest gravel bar averaged one man-minute per find. The least productive bar averaged 82.5 man-minutes per find. The average collection rate for all bars was one find per 19.5 man-minutes.

Introduction

In the past 70 years, 200 specimens of vertebrate remains have been recovered from the Red River drainage of Arkansas, Louisiana, and Texas. Hay (1924) Reported an *Equus complicatus* molar from a gravel bar near Shreveport, Louisiana. Slaughter and Hoover (1963) mentioned that channelizing of the Sulphur River in northeast Texas in 1929 had exposed Pleistocene alluvium. In processing "several tons of matrix," they recovered nine coyote-sized or larger and thirteen small mammals. Hemmings (1982) identified 15 taxa: *Chelonia*, *Megalonys jeffersoni*, *Canis familiaris*, *Canis* sp., *Ursus americanus*, *Felis* sp., *Equus caballus*, *Equus* sp., *Mylohyus nasutus*, *Odocoileus virginianus*, *Bos tarurus*, *Bison bison*, *Bison* sp., *Mammut americanum*, and *Homo sapiens* from point and channel bars of the Red River in southwest Arkansas. Over several years, F. Schambach of the Arkansas Archaeology Survey and several amateur archaeologists have collected other vertebrate remains from gravel bars along the Red River.

Other vertebrate remains have been recovered from Arkansas beyond the Red River drainage. Brown (1908) reported the excavation of Conard Fissure in Newton County and the recovery of eleven large mammals and forty-five microvertebrates. Hay (1924) noted the finds of mastodon near Helena, Trumann, and Lake Chicot. Davis (1969) and Quinn (1972) reported on their excavation of Peccary Cave, also in Newton County. Semken's (1984) interpretation of the Peccary Cave chronology is the most extensive evaluation to date of Pleistocene and Holocene climates in Arkansas.

Gravel bar sites were first located from the river channel, and their positions were estimated by using aerial photos and topographic maps. The localities were later confirmed by going to each site from fixed positions on land after gaining permission from the land owners. Table 1 provides the locations of fossil producing sites.

Table 1. Locations of fossil producing sites along the Red River, southwest Arkansas.

Locality Designation	Description	Section	Township	Range
G.C.-1	head of chute	25	T14S	R26W
G.C.-2	head of chute	13	T15S	R26W
G.C.-3	channel bar	NW,22	T14S	R26W
F.-4	head of chute	NE,24	T16S	R26W
F.-5	Kitchens Island	17	T18S	R25W
F.-8	channel bar	27	T16S	R25W
Ful.-9	mouth of Little River	19	T13S	R26W
Ful.-10	channel bar	31	T13S	R26W
Ful.-11	channel bar	5	T14S	R26W

Two collecting methods were employed to determine the abundance of vertebrate remains on gravel bars of the Red River in southwest Arkansas. In the timed method, a group of collectors searched until a specimen was found. All collectors stopped while the recorder noted the time elapsed and labeled the specimen. All would resume collecting simultaneously when the clock was reset. Other collections were made without measuring the time elapsed. The number of fossils collected per bar during 1992 and the number of man-minutes per find on the seven bars in which timed collections were made are presented in Table 2.

Table 2. Number of specimens collected during 1992 from seven gravel bars of the Red River, southwest Arkansas.

Locality Designation	Man-minute per find	Total Specimens Collected
G.C.-1	13.2	58
G.C.-3	11.0	6
F-4	14.9	12
F-5	82.5	8
F-8	1.0	89
Ful-9	4.1	13
Ful-11	9.5	6
Mean	19.5	192

Due to uncertain boundaries along the Red River, many of the county lines are listed as "indefinite" or "approximate," reflecting the ever-changing position of the channel. Further, the exact position of many of the gravel bars has not been located to any greater precision than one square mile section. All the "channel bars" localities are on the right bank of the river.

Unless otherwise noted, all bone measurements are of total lengths, taken by using a bone-board. Other critical measurements were taken with calipers. The degree of fossilization in each specimen was determined by using the criteria mentioned by Hemmings (1982). The three levels were "modern" indicating bone with ivory-like color with some elasticity, "subfossil" determined by pale brown to brown color with observable weight increase or loss of elasticity; and "fossil" noted by very dark color with increased weight and hardness.

Faunal List (*denotes extinct species)

Class: Reptilia

Terrapene sp. *

Geochelone sp. (giant tortoise) *

Macrolemys temminckii (alligator snapping turtle)

Apalone spinifera (spiny soft-shell turtle)

Alligator mississippiensis (American alligator)

Class: Aves

Antatidae (duck)

Chen hyperborea (snow goose)

Meleagris gallopavo (turkey)

Class: Mammalia

Order: Marsupialia

Dedelpis virginiana (opossum)

Order: Edentata

Holmesina septentrionalis (pampatheres) *

Order: Lagomorpha

Lepus californicus (black-tailed jack rabbit)

Order: Rodentia

Castor canadensis (beaver)

Order: Carnivora

Canis latrans (coyote)

Canis familiaris (dog)

Ursus americanus (black bear)

Procyon lotor (raccoon)

Felis rufus (bobcat)

Order: Artiodactyla

Palaeolama mirifica (llama) *

Sus scropha (pig)

Odocoileus virginianus (white-tail deer)

Bison sp. (bison) *

Bos sp. (cow)

Capra hircus (goat)

Order: Proboscidea

Mammot americanum (mastodon) *

Notes On Pleistocene Species

Terrapene sp.

Specimens examined: (6) *Terrapene ornata*

Specimen referred: (1) plastron fragment G.C.-1-2

Remarks: The specimen G.C.-1-2 is judged to be a fragment of a plastron of *Terrapene* due to its growth lines on the abdominal surface anterior to the hinge line, but it has more nearly square edges than the recent turtle specimens examined. The fossil specimen is 8 mm thick as compared to 3 mm in the known *Terrapene* specimen. The fossil specimen is dark brown, well mineralized, and may represent the extinct Pleistocene form, *T. carolina putnami*.

Geochelone sp.

Specimens examined: (2) *Terrapene ornata*

Specimen referred: (1) plastron fragment G.C.-1-3

Remarks: After comparison with modern *Terrapene* specimens, the fragment is interpreted as a portion of the left half of a plastron. The fossil specimen displays a portion of the suture or hinge line and is 23 mm thick.

Holmesina septentrionalis

Specimen examined: (1) *Holmesina septentrionalis*

Specimen referred: (1) buckler osteoderm G.C.-1-5

Remarks: The specimen G.C.-1-5 (Fig. 1) displays the depressed marginal band completely around the osteoderm mentioned to be characteristic of pampatheres (Edmund, 1987). Inside the marginal band is a pitted ridge 1.0 mm to 3.0 mm wide, and there is a slight ridge extending from the marginal band to the center. The fossil specimen is more nearly square than an SAU specimen of *Holmesina septentrionalis* collected from the Sulphur River in east Texas by Davis and Ball (1991). The localities in east Texas are less than 200 miles west of the collection site of the specimen G.C.-1-5.

Palaeolama mirifica

Specimens examined: (1) *Bison bison*, (1) *Ovibos* sp.,

(4) *Palaeolama*, (1) *Alces alces*,

(1) *Oreamnos americanus*

Specimen referred: (1) distal scapula 85-389



Fig. 1. The external view of a buckler osteoderm from *Holmesina septentrionalis*. Scale 3 cm.

Remarks: The fossil specimen was compared to several recent ruminants because it displays an abrupt rise from the glenoid cavity and neck to the spine, a feature not seen in horses (Fig. 2). The dorsoventral dimension of the articulation surface in specimen 85-389 is 48 mm as compared to an average of 50 mm in four fossil specimens of *Palaeolama* from south Texas (observed range 49 mm to 51 mm). The lateromedial width of the articulation surface in specimen 85-389 is 63 mm as compared to an average of 61 mm in the known *Palaeolama* specimen (observed range 59 mm to 64 mm). A third measure was taken on all specimens between the glenoid and the lateral process. The Red River fossil specimen measured 31 mm, and all of the known *Palaeolama* specimens measured 30 mm for this width. Webb (1974) reviewed North American llama specimens and revised their taxonomy. *Palaeolama mirifica*, originally known from Seminole Field, Pinellas County, Florida, is now regarded as extending around the Gulf Coast to Texas, based on the work of Lundelius (1972) at the Ingleside local fauna. Although a partial skeleton of *Palaeolama* was recovered from the "boot heel" of Missouri (R.W. Graham, per. comm., April, 1993), it is thought the specimen at hand represents the first known occurrence for the state of Arkansas.

Bison sp.

Specimens examined: (3) *Bos* sp., (3) *Bison antiquus*,
(1) *Bison bison*

Specimen referred: (1) ischium F-5-1

Remarks: The fossil specimen was nearly two times longer and wider than the ischium of an adult male *Bison bison*. The fossil specimen was also compared to a *Bison antiquus* pelvis. From the tuber ischia to the medial process of the ischium, the *Bison antiquus* measured 100 mm as compared to 135 mm in the fossil specimen. The width anterior to the tuber ischia in the *Bison antiquus* was 95 mm as compared to 115 mm in the fossil speci-

men. The fossil specimen appears to be the same size as a *Bison antiquus* specimen mounted and displayed at the University of Kansas Museum.

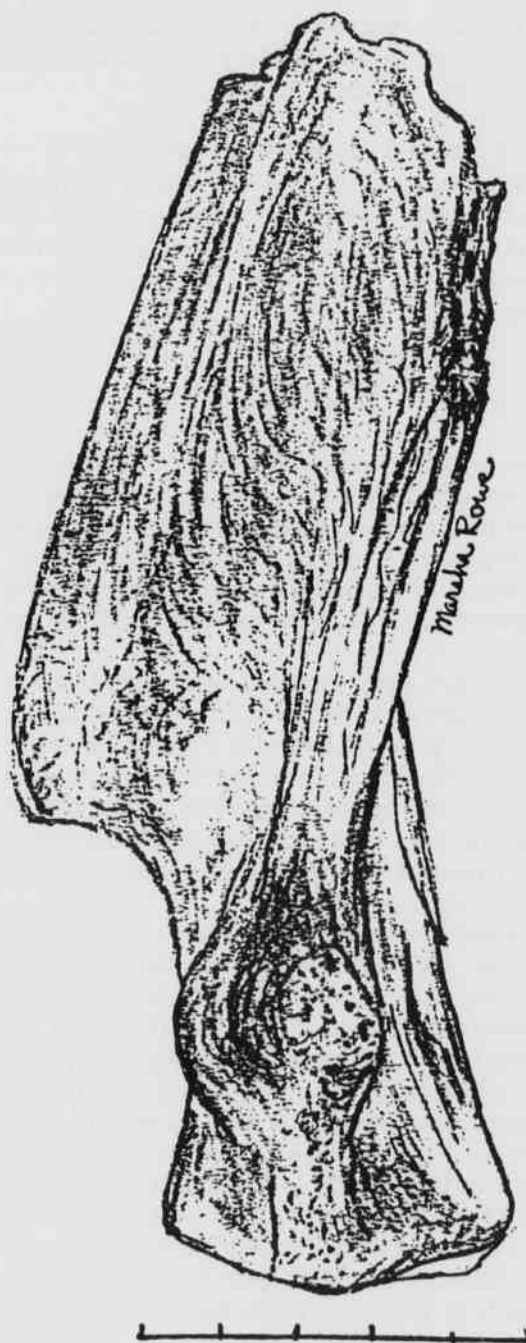


Fig. 2. Anterior view, distal portion of the right scapula of *Palaeolama mirifica*. Scale 5 cm.

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Mammut americanum

Specimen referred: (1) M3 and several bone fragments

Remarks: The fossil specimen commonly referred to as the Mud Creek mastodon is highly fragmented. Identification was based on the upper third molar which displayed the characteristic high crest or cusps of mastodon teeth, in contrast to mammoths (Olsen, 1960). One proximal femur among the post-cranial fragments has a diameter of 159 mm.

cf. *Mammut americanum*

Specimen referred: (1) tusk fragment 3MI-45

Remarks: The specimen is tentatively assigned to *Mammut americanum* due to the fact it was found several miles down stream from the Mud Creek locality and due to the abundance of the species during the late Pleistocene.

Discussion

Abundance Of Specimens.--Of the seven gravel bars (Table 1) on which collections were timed, specimens were found in the greatest abundance on G.C.-1 and F-8 which are separated by about 12 miles. Man-minutes per find was chosen as the index for concentration of specimens on gravel bars due to the varying size of the groups collecting.

G.C.-1 yielded four Pleistocene species (four specimens), F-8 two Pleistocene species (three specimens), and four other sites produced only one specimen each. The ratio between the Pleistocene specimens and the total number of specimens varies between 0.33 and 0.55 for seven sites, and shows little correlation to total number of specimens collected. There is no apparent point source for the Pleistocene specimens.

Climatic Implications.--Of the remains collected along the Red River, the black-tailed jack rabbit, alligator snapping turtle and the American alligator have the most significant modern ranges. The jack rabbit is a prairie dweller while the alligator snapping turtle and the American alligator are limited by their need for warm temperatures and bodies of water. An area of sympatry (region where a portion of the ranges of all the species recovered overlap, Fig. 3) is located at the junction of southeast Oklahoma, northeast Texas, and southwest Arkansas. Another small area of sympatry in coastal southeast Texas near the Louisiana border does exist, but the region is at least 270 miles from the Red River in southwest Arkansas, and it is not thought to be relevant. The Arkansas, Texas, and Oklahoma area is near the boundary between the western plains and the eastern forests. The area of sympatry for the surviving animals is so near where their remains were found that apparently, even in this boundary area, there is no evidence of signifi-

cant climatic shift in the span of time represented by the fossil remains.

Of the 23 species of vertebrates, *Terrapene* sp., *Geochelone* sp., *Holmesina septentrionalis*, and *Palaeolama mirifica* represent the first known occurrences in Arkansas. Also collected were an extinct *Bison* and *Mammut americanum* which are also part of the Pleistocene megafauna that became extinct 10 to 11 thousand years ago. All other species encountered are either present or have been recently extirpated in this area.



Fig. 3. Area of sympatry for modern vertebrates recovered from the Red River alluvium. Animals ranges after Burt and Grossenheider (1964) and Conant and Collins (1991).

Acknowledgements

I would like to thank K. Ball, D. Nelson, and E. Millican for field assistance. F. Schambach granted access to most of the specimens in this study. L.D. Martin, R. Timm, M. Hilmann, and E. Lundelius, Jr., provided specimens for comparisons. M. Rowe provided the illustrations and L.C. Davis provided valued consultations. D. Jean helped determine site locations. R. Eichenbuger and D. Nelson read the manuscript.

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